

Listing of Claims:

1-5 (Cancelled)

6. (Currently Amended) A borosilicate glass, ~~The borosilicate glass of claim 1,~~ wherein the CTE of the borosilicate glass is in a range from about $30 \times 10^{-7}/^{\circ}\text{C}$ to $45 \times 10^{-7}/^{\circ}\text{C}$, wherein the softening point of the borosilicate glass is in a range between about 600 and 1000 $^{\circ}\text{C}$, wherein the borosilicate glass has a percent weight loss of less than 10 milligrams/dm² according to an acid resistance test, wherein the borosilicate glass has a percent weight loss of less than 250 milligrams/dm² according to an alkali resistance test, and wherein the borosilicate glass ~~composition~~ comprises:

SiO₂ in the range from about 68% to 73% by total composition weight;

B₂O₃ in the range from about 13% to 17% by total composition weight;

Al₂O₃ in the range from about 8% to 15% by total composition weight; and

lithium oxide (Li₂O) in the range from about 2% to 5% by total composition weight; and

~~zirconium oxide (ZrO₂) in the range from about 1% to 3% by total composition weight,~~

wherein the borosilicate glass resists devitrification upon sintering without the addition of an inhibitor oxide ~~wherein the sum of the weight percent of SiO₂, Al₂O₃, and ZrO₂ is less than 78% by total composition weight.~~

7. (Withdrawn) A method of making a borosilicate glass, comprising:
forming a homogeneous mixture by mixing a plurality of components, comprising:
silicon dioxide (SiO₂) in a range from about 60% to 74% by total composition weight,
boric oxide (B₂O₃) in a range from about 9% to 25% by total composition weight,
aluminum oxide (Al₂O₃) in a range from about 7% to 17% by total composition weight, and
at least one alkali oxide in a range from about 2% to 7% by total composition weight;
melting the homogeneous mixture; and

sintering the homogeneous mixture forming a borosilicate glass,

wherein the borosilicate glass has a coefficient of thermal expansion (CTE) that is in a range between about $30 \times 10^{-7}/^{\circ}\text{C}$ and $55 \times 10^{-7}/^{\circ}\text{C}$, and wherein the homogeneous mixture resists devitrification upon sintering without the addition of an inhibitor oxide.

8. (Withdrawn) The method of claim 7, wherein forming a homogeneous mixture by mixing a plurality of components further includes:

zirconium oxide (ZrO_2) in the range from about 0.1% to 5% by total composition weight.

9. (Withdrawn) The method of claim 7, wherein melting the homogeneous mixture further includes:

melting the homogeneous mixture at about 1650°C .

10. (Withdrawn) The method of claim 7, wherein the CTE of the borosilicate glass is in a range from about $30 \times 10^{-7}/^{\circ}\text{C}$ to $45 \times 10^{-7}/^{\circ}\text{C}$, wherein the softening point of the borosilicate glass is in a range between about 600 and 1000°C , wherein the borosilicate glass has a percent weight loss of less than 10 milligrams/ dm^2 according to an acid resistance test, wherein the borosilicate glass has a percent weight loss of less than 250 milligrams/ dm^2 according to an alkali resistance test; and wherein the homogeneous mixture further includes:

SiO_2 in the range from about 68% to 73% by total composition weight;

B_2O_3 in the range from about 13% to 17% by total composition weight;

Al_2O_3 in the range from about 8% to 15% by total composition weight;

lithium oxide (Li_2O) in the range from about 2% to 5% by total composition weight; and

zirconium oxide (ZrO_2) in the range from about 1% to 3% by total composition weight, wherein the sum of the weight percent of SiO_2 , Al_2O_3 , and ZrO_2 is less than 78% by total composition weight.

11. (Withdrawn) The method of claim 7, wherein forming a homogeneous mixture by mixing a plurality of components further includes:
- at least one alkaline-earth oxide; and
 - at least one rare-earth oxide, wherein the sum of the weight percentage is in the range from about 0.1% to 7% by total composition weight.
12. (Withdrawn) The method of claim 12, wherein the alkaline-earth oxide is selected from barium oxide (BaO), strontium oxide (SrO), calcium oxide (CaO), and magnesium (MgO), and wherein the rare-earth oxide is selected from lanthanum oxide (La₂O₃), tantalum oxide (Ta₂O₃), yttrium oxide (Y₂O₃) and cerium oxide (CeO₂).
13. (Withdrawn) The method of claim 10, wherein sintering the homogeneous mixture further includes:
- sintering the homogeneous mixture at a temperature about 20°C above the softening point of the homogeneous mixture.
14. (Withdrawn) A microfluidic device, comprising:
- a first assembly comprising a microstructure and a first substrate, wherein the microstructure is disposed on the substrate; and
 - a second assembly comprising a second substrate and a precursor material, wherein the second assembly and the first assembly are positioned such that the precursor material and the microstructure are adjacent one another, wherein the second assembly is positioned on the microstructure after the first assembly is presintered and adhered thereto by heat treatment to form a one-piece microstructure defining at least one recess between the first and second assemblies, wherein the precursor material includes:
 - silicon dioxide (SiO₂) in a range from about 60% to 74% by total composition weight;
 - boric oxide (B₂O₃) in a range from about 9% to 25% by total composition weight;

aluminum oxide (Al_2O_3) in a range from about 7% to 17% by total composition weight; and

at least one alkali oxide in a range from about 2% to 7% by total composition weight,

wherein the precursor material has a coefficient of thermal expansion (CTE) that is in a range between about $30 \times 10^{-7}/^\circ\text{C}$ and $55 \times 10^{-7}/^\circ\text{C}$, and wherein the precursor material resists devitrification upon sintering without the addition of an inhibitor oxide.

15. (Withdrawn) The microfluidic device of claim 14, wherein the precursor material further comprises:

zirconium oxide (ZrO_2) in the range from about 0.1% to 5% by total composition weight.

16. (Withdrawn) The microfluidic device of claim 14, wherein the CTE of the precursor material is in a range from about $30 \times 10^{-7}/^\circ\text{C}$ to $45 \times 10^{-7}/^\circ\text{C}$, wherein the softening point of the precursor material is in a range from about 600 to 1000 $^\circ\text{C}$, wherein the precursor material has a percent weight loss of less than 10 milligrams/ dm^2 according to an acid resistance test, wherein the precursor material has a percent weight loss of less than 250 milligrams/ dm^2 according to an alkali resistance test, and wherein the precursor material comprises:

SiO_2 in the range from about 68% to 73% by total composition weight;

B_2O_3 in the range from about 13% to 17% by total composition weight;

Al_2O_3 in the range from about 8% to 15% by total composition weight;

lithium oxide (Li_2O) in the range from about 2% to 5% by total composition weight; and

zirconium oxide (ZrO_2) in the range from about 1% to 3% by total composition weight, wherein the sum of the weight percent of SiO_2 , Al_2O_3 , and ZrO_2 is less than 78% by total composition weight.

17. (Withdrawn) The microfluidic device of claim 14, wherein the precursor material further comprises:

at least one alkaline-earth oxide; and

at least one rare-earth oxide, wherein the sum of the weight percentage is in the range from 0.1% to 7% by total composition weight.

18. (Withdrawn) The microfluidic device of claim 17, wherein the alkaline-earth oxide is selected from barium oxide (BaO), strontium oxide (SrO), calcium oxide (CaO), and magnesium (MgO), and wherein the rare-earth oxide is selected from lanthanum oxide (La₂O₃), tantalum oxide (Ta₂O₃), yttrium oxide (Y₂O₃) and cerium oxide (CeO₂).

19. (Withdrawn) A method of fabricating a microfluidic device, comprising:

providing a first assembly comprising a microstructure and a first substrate,

wherein the microstructure is disposed on the substrate;

providing a second assembly comprising a second substrate and a precursor material wherein the precursor material includes:

silicon dioxide (SiO₂) in a range from about 60% to 74% by total composition weight;

boric oxide (B₂O₃) in a range from about 9% to 25% by total composition weight;

aluminum oxide (Al₂O₃) in a range from about 7% to 17% by total composition weight; and

at least one alkali oxide in a range from about 2% to 7% by total composition weight,

wherein the precursor material has a coefficient of thermal expansion (CTE) that is in a range between about $30 \times 10^{-7}/^{\circ}\text{C}$ and $55 \times 10^{-7}/^{\circ}\text{C}$ upon sintering, and wherein the precursor material resists devitrification upon sintering without the addition of an inhibitor oxide;

disposing the first assembly on the second assembly such that the precursor material and the microstructure are adjacent one another; and

heating the first assembly and the second assembly to form a one-piece microstructure defining at least one recess between the first and second assemblies.

20. (Withdrawn) The method of claim 19, wherein providing a second assembly comprising a second substrate and a precursor material wherein the precursor material further comprises:

zirconium oxide (ZrO_2) in the range from about 0.1% to 5% by total composition weight.

21. (Withdrawn) The method of claim 19, wherein the CTE of the precursor material is in a range from about $30 \times 10^{-7}/^\circ\text{C}$ to $45 \times 10^{-7}/^\circ\text{C}$, wherein the softening point of the precursor material is in a range from about 600 to 1000 $^\circ\text{C}$, wherein the precursor material has a percent weight loss of less than 10 milligrams/ dm^2 according to an acid resistance test, wherein the precursor material has a percent weight loss of less than 250 milligrams/ dm^2 according to an alkali resistance test, and wherein the precursor material comprises:

SiO_2 in the range from about 68% to 73% by total composition weight;

B_2O_3 in the range from about 13% to 17% by total composition weight;

Al_2O_3 in the range from about 8% to 15% by total composition weight;

lithium oxide (Li_2O) in the range from about 2% to 5% by total composition weight; and

zirconium oxide (ZrO_2) in the range from about 1% and 3% by total composition weight, wherein the sum of the weight percent of SiO_2 , Al_2O_3 , and ZrO_2 is less than 78% by total composition weight.

22. (Withdrawn) The method of claim 19, wherein providing a second assembly comprising a second substrate and a precursor material wherein the precursor material further comprises:

at least one alkaline-earth oxide; and

at least one rare-earth oxide, wherein the sum of the weight percentage is in the range from 0.1% to 7% by total composition weight.

23. (Withdrawn) The method of claim 22, wherein the alkaline-earth oxide is selected from barium oxide (BaO), strontium oxide (SrO), calcium oxide (CaO), and magnesium (MgO); and wherein the rare-earth oxide is selected from lanthanum oxide (La₂O₃), tantalum oxide (Ta₂O₃), yttrium oxide (Y₂O₃) and cerium oxide (CeO₂).

24. (Withdrawn) The method of claim 19, wherein heating the first assembly and the second assembly to form a one-piece microstructure defining at least one recess between the first and second assemblies further comprises:

heating the first assembly and the second assembly at about 820 °C for about 5 hours to form a one-piece microstructure.

25. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes:

zirconium oxide (ZrO₂) in the range between about 0.1% and 5% by total composition weight.

26. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes:

zirconium oxide (ZrO₂) in the range between about 1% and 3% by total composition weight.

27. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes one or more alkaline-earth oxides wherein the sum of the weight percentages of the alkaline-earth oxides is in a range between about 0.1% and 7% by total composition weight.

28. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes one or more rare-earth oxides wherein the sum of the weight percentages of the rare-earth oxides is in a range between about 0.1% and 7% by total composition weight.

29. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes one or more alkaline-earth oxides and one or more rare-earth oxides wherein the sum of the weight percentages of the alkaline-earth oxides and the rare-earth oxides is in a range between about 0.1% and 7% by total composition weight.

30. (New) The borosilicate glass of claim 6, wherein alkaline-earth oxide is selected from at least one of barium oxide (BaO), strontium oxide (SrO), calcium oxide (CaO), and magnesium oxide (MgO), and wherein the rare-earth oxide is selected from at least one of lanthanum oxide (La₂O₃), tantalum oxide (Ta₂O₃), yttrium oxide (Y₂O₃) and cerium oxide (CeO₂).

31. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes substantially no sodium oxide (Na₂O).

32. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes substantially no potassium oxide (K₂O).

33. (New) The borosilicate glass of claim 6, wherein the borosilicate glass further includes substantially no potassium oxide (K₂O) and substantially no sodium oxide (Na₂O).